# Economic Growth and Greenhouse Gas Mitigation in California

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## EXECUTIVE SUMMARY

The California economy has an enviable record of technological progress, and the challenge presented by climate change is a new opportunity for the state to demonstrate its talent for combining advances in public policy and private sector innovation to enhance environmental quality and economic growth.

This research note offers preliminary results on the link between greenhouse gas (GHG) abatement strategies and economic growth from on-going research with a forecasting model of the California economy. The Berkeley Energy and Resources (BEAR) Model is a detailed empirical simulation tool that can evaluate the complex linkages between climate policy and economic activity. In the analysis presented here, eight targeted GHG emission policies are combined with an overall cap to meet the state's targets for 2020. No specific implementation of the cap is assumed; these results can be interpreted as the result of an efficient combination of policies. Examining alternative scenarios for state climate policy over the next fifteen years, a few salient conclusions emerge:

1. California's GHG targets are attainable, but too ambitious to be met by voluntary initiative. Policy action to meet the targets should be relatively inclusive, with mandatory participation by all sectors representing a significant share of emissions.

2. An Emissions Cap, supported by regulatory and market-based implementation programs, can return California's GHG emissions to 1990 levels by 2020 and stimulate the state economy.

3. Climate policies that create direct incentives for industries to invest in new technologies can provide additional stimulus for new employment and growth.

**Table ES-1: Macroeconomic Impacts of 8 CAT policies plus a 2020 GHG Cap***
***(1990 GHG Emissions Levels by 2020)

| **Annual Impact** | 8 CAT policies + Cap | 8 CAT policies + Cap w/Innovation Incentives |
|---|---|---|
| **Gross State Product (2006 dollars)**<br>*% change from 2020 baseline* | **+$60 Billion**<br>*(+2.4%)* | **+$74 Billion**<br>*(+3.1%)* |
| **Employment (thousands)**<br>*% change from 2020 baseline* | **+17**<br>*(+.08%)* | **+89**<br>*(+0.44%)* |

The findings reported here indicate that California can establish global leadership in growth-oriented climate policy and energy innovation. Well-designed and implemented strategies can bring forth the state's enormous innovation potential and apply it to one of the most compelling challenges of our era.

Notes on the policy scenarios and results:

The policy scenarios included here are designed to represent important elements of California's climate action policies that are under development, including AB32 ("The California Global Warming Solutions Act") as well as several Climate Action Team (CAT) measures. One of the key findings of this report is that regulatory and market-based strategies are complementary; each excels at achieving different forms of mitigation. We show how all significant stationary source emitters could contribute to meeting the state's reduction goals, either through inclusion in a cap, an offset mechanism, or through regulatory programs.

The analysis presented here is an update to a study released in January that concluded achieving half the 2020 targets would promote economic growth in California (Roland-Holst, 2006). This study extends the earlier work to meet all of the 2020 targets, and confirms the earlier conclusion about economic benefits.

The positive economic results are derived from two primary sources: savings from improvements in energy efficiency and reduced energy bills that offset the cost of achieving emission reductions and, in related policy scenarios, the benefits of investing in technologies for innovation. California has a long history of leadership in both of these areas, and continuing along these lines will yield positive economic and environmental benefits for the state.

While our results are encouraging, they may be overly conservative for several reasons. First, we do not consider spontaneous technological innovation in this version of the BEAR model, and only a few GHG mitigation technologies are represented explicitly, although these features will be added to later versions of the model. Second, only 8 of 34 Climate Action Team policies are modeled here, and several with significant mitigation potential are not considered. Including these would reduce the estimated mitigation burden and attendant costs for industries covered in this analysis. Third, the results consider only limited potential for technical and fuel substitution (e.g., the substitution of renewable energy sources for fossil fuel power plants). Finally, we do not allow for lower-cost reductions from offsets or links to other carbon regimes to replace reductions from the sources considered here.